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Circulative non-propagative aphid-transmission of nanoviruses: an oversimplified view

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Plant virus species of the family *Nanoviridae* have segmented genomes with the highest known number of segments encapsidated individually. They thus likely represent the most extreme cases of the so-called multipartite or multicomponent viruses. All species of this family are believed to be transmitted in a circulative non-propagative manner by aphid vectors, meaning that the virus simply crosses cellular barriers within the aphid body, from the gut to the salivary glands, without replicating or even expressing any of its genes. However, this assumption is largely based on analogy with the transmission of other plant viruses such as geminiviruses or luteoviruses, and the details of the molecular and cellular interactions between aphids and nanoviruses is actually poorly investigated. When comparing the relative frequencies of the eight genome segments in populations of the species*Faba bean necrotic stunt virus* (FBNSV, genus *Nanovirus*) within host plants and within aphid vectors fed on these plants, we evidenced reproducible changes of the frequency of some specific segments. We further show that these changes occur at early stages of the virus cycle in the aphid, within the gut, and not later when the virus is translocated into the salivary glands. This peculiar observation, which was confirmed in the three aphid vector species *Acyrtosiphon pisum*, *Aphis craccivora* and*Myzus persicae*, calls for a revisiting of the mechanisms of nanovirus transmission. It reveals an unexpected intimate interaction that may not fit the canonical circulative non-propagative transmission.

Mots-clés : *Nanovirus*, FBNSV, vector-transmission, aphid.